**CLAIMS**

1. A method for embedding optical band gap (OBG) devices in a ceramic substrate comprising the steps of:

pre-forming an OBG structure;

coating the OBG structure with a surface binding material;

inserting the OBG structure into the ceramic substrate; and

performing firing operations on the ceramic substrate.

2. The method according to claim 1, wherein said step of inserting the OBG structure comprises inserting the OBG structure into a via formed within the ceramic substrate.

3. The method according to claim 1, wherein said step of performing firing operations on the ceramic substrate comprises the steps of:

pre-firing the ceramic substrate at a first temperature for a first duration of time;

sintering the ceramic substrate at a second temperature for a second duration of time; and

sintering the ceramic substrate at a third temperature for a third duration of time.

4. The method according to claim 1, further comprising the step of slow cooling the ceramic substrate after said step of performing firing operations.

5. The method according to claim 1, wherein the surface binding material comprises calcium.

6. The method according to claim 5, wherein the surface binding material further comprises hexane.

7. The method according to claim 6, wherein a ratio of the calcium to the hexane is from about 1% to 2%.

8. The method according to claim 1, wherein said step of pre-forming the OBG structure comprises pre-forming the OBG structure from at least one material selected from the group consisting of indium phosphide and indium gallium arsenide.

9. The method according to claim 1, wherein the ceramic substrate comprises a plurality of substrate layers.

10. The method according to claim 1, wherein the ceramic substrate comprises low temperature co-fired ceramic.

11. A ceramic substrate comprising an OBG structure having a surface coating of a surface binding material, said OBG structure being disposed in said ceramic substrate.

12. The ceramic substrate of claim 11, wherein said OBG structure is disposed within a via in said ceramic substrate.

13. The ceramic substrate of claim 11, wherein said surface binding material comprises calcium.

14. The ceramic substrate of claim 13, wherein said surface binding material further comprises hexane.

15. The ceramic substrate of claim 14, wherein a ratio of the calcium to the hexane is from about 1% to 2%.

16. The ceramic substrate of claim 11, wherein said OBG structure comprises at least one material selected from the group consisting of indium phosphide and indium gallium arsenide.

17. The ceramic substrate of claim 11, wherein said ceramic substrate comprises a plurality of substrate layers.

18. The ceramic substrate of claim 11, wherein said ceramic substrate comprises low temperature co-fired ceramic.